



# NEURAL NETWORK BASED WEATHER FORECASTING MODEL

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## ABSTRACT

Weather forecasting has become an important field of research in the last few years. Climate determining need get to be a paramount field from claiming examination in the most recent couple of A long time. Over A large portion of the instances endeavored a straight relationship the middle of the enter climate information and the relating target information. Climate determining may be a standout amongst the provisions from claiming information mining innovation organization with foresee the state from claiming air for An future the long run Furthermore An provided for area Likewise respects heat, cloudiness, dryness, wind, rain, and so forth. Temperature prediction with Humidity is also one of the important and challenging problem or task in today life. Temperature prediction using Humidity is attempt to forecast the state of the atmospheric parameters such as: Temperature, Humidity, etc. Climate determining may be those provision of science Furthermore innovation should anticipate those state of the environment to An provided for area. Simulated neural system may be a paramount strategy to determining such issues. The recommended ANN evaluates those execution of the produced models Toward applying separate neurons, concealed layers What's more exchange works to foresee temperature to 365 days of the quite a while. In this paper, many system parameters would used: Divide function, Train function, Performance function, Training ratio, Testing ratio, etc.

**KEYWORDS:** data mining, weather forecasting, neural network, prediction, function, temperature, humidity, Climate.

## INTRODUCTION

Weather determining may be those practically critical useful reason which makes us accept that meteorology is really a science[1]. Weather forecasts are aggravated Toward gathering quantitative information around those current state of the environment Also utilizing exploratory Comprehension from claiming climatic forms should venture how the air will advance. [2]. Climate determining will be the utilization of science What's more innovation all the while so as will foresee climate to a particular area. The environment condition need aid discerned incompletely, forecasting effects need aid not Typically exact and the existing numerical models that would utilized to this reason don't give acceptable exact predictions. Due to this motivation behind there is a requirement to Creating additional exact models that might handle superior effects. Neural networks (NN) need aid a standout amongst the mossycup oak capable computerized reasoning techniques that would utilized to nonlinear demonstrating Furthermore particularly to climate forecasting[3]. Weather forecasting bring two variables: In it's utilized to A large number human exercises What's more secondly, because of those advantage made Eventually Tom's perusing those Different innovative developments that would specifically identified with this cement investigate field, similar to those advancement about calculation and the change in estimation systems[4]. Weather forecasting entails foreseeing how the exhibit state of the environment will change. Display climate states need aid got Toward ground observations, perceptions starting with ships What's more aircraft, Doppler radar, What's more satellites. This data is sent to meteorological focuses the place the information would collected, analyzed, Also produced under an assortment for charts, maps, Furthermore graphs[4].

Types of forecasting:

1. **Now casting:** In this type of forecasting, current weather and forecasts up to a few hours ahead are given.
2. **Short range forecasts (1 to 3 days):** done which those climate On each progressive 24 hr intervals might make predicted dependent upon 3 times.
3. **Medium range forecasts (4 to 10 days):** Normal climate states and the climate ahead every day might be endorsed with progressively lesseps points What's more precision over that for short extent forecasts.
4. **Long range /Extended Range forecasts (more than 10 days to a season):** done long extent Forecasting, climate prediction might extend from a month to month with An occasional forecast[5].

## METHODS

### Hidden Markov Model:

A hidden Markov model (HMM) is a statistical Markov model in which those framework continuously demonstrated is accepted with be a markov process for surreptitiously (hidden) states. An HMM could make exhibited Similarly as the simplest changing bayesian system. Those math behind those HMM were created by I. E. Baum What's more coworkers.. In simple Markov models (like a Markov chain), the state is directly visible to the observer, and therefore the state

transition probabilities are the only parameters. For An hidden markov model, those state will be not specifically visible, yet the output, subject to those state, something like that it is unmistakable. Those modifier 'hidden' alludes all the of the state grouping through which the model passes, not of the parameters of the model. Hidatsa markov models need aid uncommonly referred to to their provision for fleeting example distinguishment for example, speech, handwriting, gesture recognition, part-of-speech tagging, musical score taking after What's more bioinformatics[14].

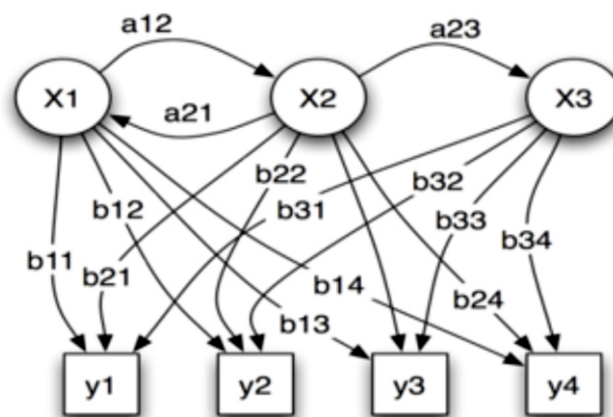


Figure 1. Hidden Markov Model<sup>[14]</sup>

## ARTIFICIAL NEURAL NETWORK

An artificial neural network is composed of many artificial neurons that are linked together according to a specific network architecture. Neural network transform the inputs into meaningful outputs. Neural networks have performed successfully where other methods have not, predicting system behavior, recognizing and matching complicated, vague, or incomplete data patterns. Artificial Neural Network is used for pattern recognition, prediction, fingerprint matching, etc. Artificial neural system may be utilized for design recognition, prediction, fingerprint matching, etc. Neural networks have performed effectively the place different techniques need not, foreseeing framework behavior, distinguishing What's more matching complicated, vague, or inadequate information designs. Neural networks are made of straightforward components operating Previously, parallel.. These elements are inspired by biological nervous systems. There would diverse Taking in calculations that might be connected to train a neural framework. The most popular of them is the back propagation algorithm, which need different variants. Standard back propagation may be a gradient descent algorithm[15].

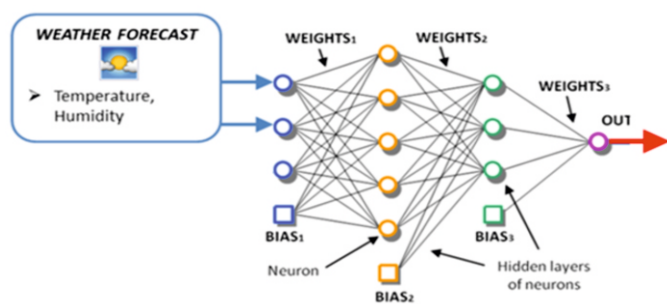
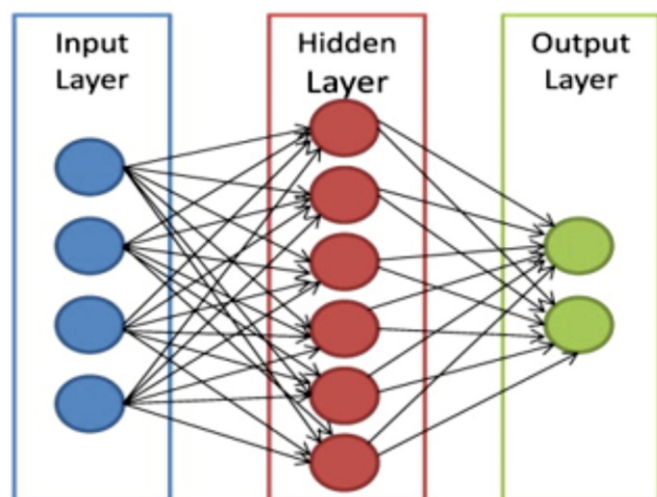


Figure 2: Neural Network

Artificial Neural Network is computational system based on human nervous system. Also known as a "Knowledge Based Information System". Means, first we teach the system, then this system using that knowledge give the appropriate answers of any problem just like human.

#### Layers of Neural Network:

1. **Input layer:** Activity of input layer represents the information which fed in to the system. Also we can say the input of the bounded non-linear function.
2. **Hidden layer:** Activity of each hidden unit represents by activities of input units and weights on connections between input and hidden units.
3. **Output layer:** Representation of the output units is depends on the activity of the hidden units and the weights between the hidden and output units[15].

Figure 3: ANN structure<sup>[15]</sup>

## RESULTS

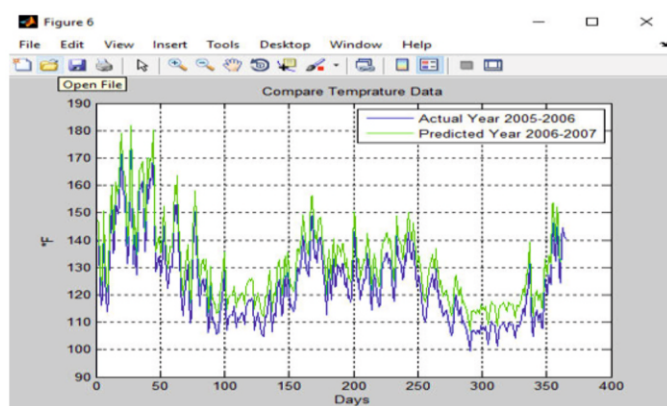


Figure 4:HMM

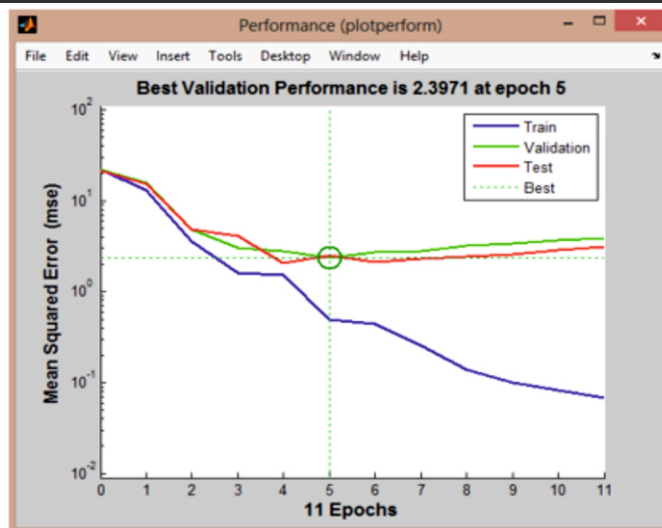


Figure 5: Performance ANN

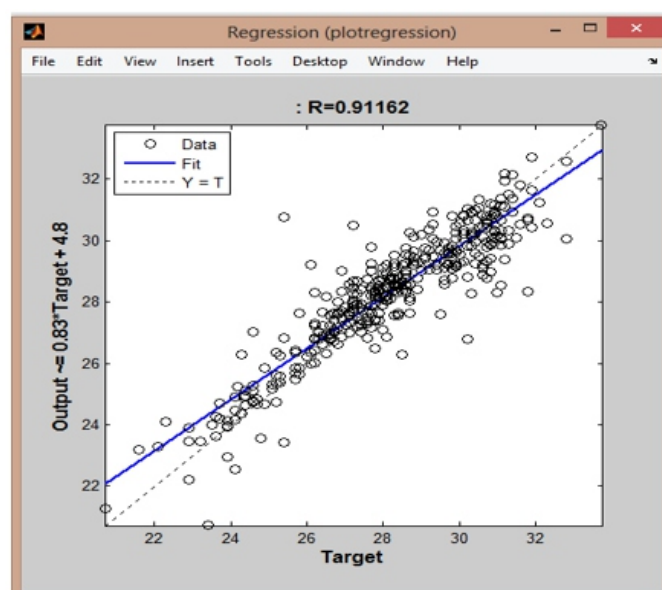
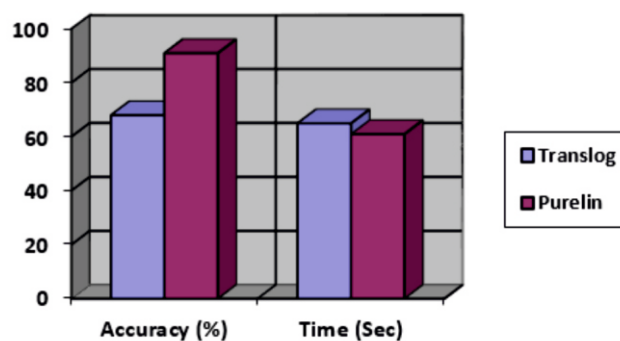


Figure 6:Regression ANN

Table 1:Analysis

Hidden layers	Transfer Function	MSE	Epoch	Time	Accuracy
4	Translog	2.38	38	00:01:05	0.68
14	Purelin	0.0925	11	00:01:01	0.91



## CONCLUSION

The aim in this dissertation is to proposed model based on Neural Network and their variations. So as effectively predict future values considering past multi-attributes data. Model. As number of inputs increases accuracy will increases. In future, adding time and humidity parameter for weather forecasting model using Artificial Neural Network for better prediction.

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